

The image features a white and blue X-57 Maxwell aircraft with red and white stripes on the fuselage, flying over a dense cityscape. The aircraft has a long, thin wing with multiple propellers. The background shows a city with many buildings and a body of water.

X-57 Maxwell

NASA's First Electric X-Plane

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What is the X-57 Maxwell?



- NASA's first all-electric experimental airplane!
- Some primary goals the X-57 has:
 - Reduce the energy required in flight
 - Use existing state-of-the-art technology
 - Learn about the integration challenges of electric aircraft

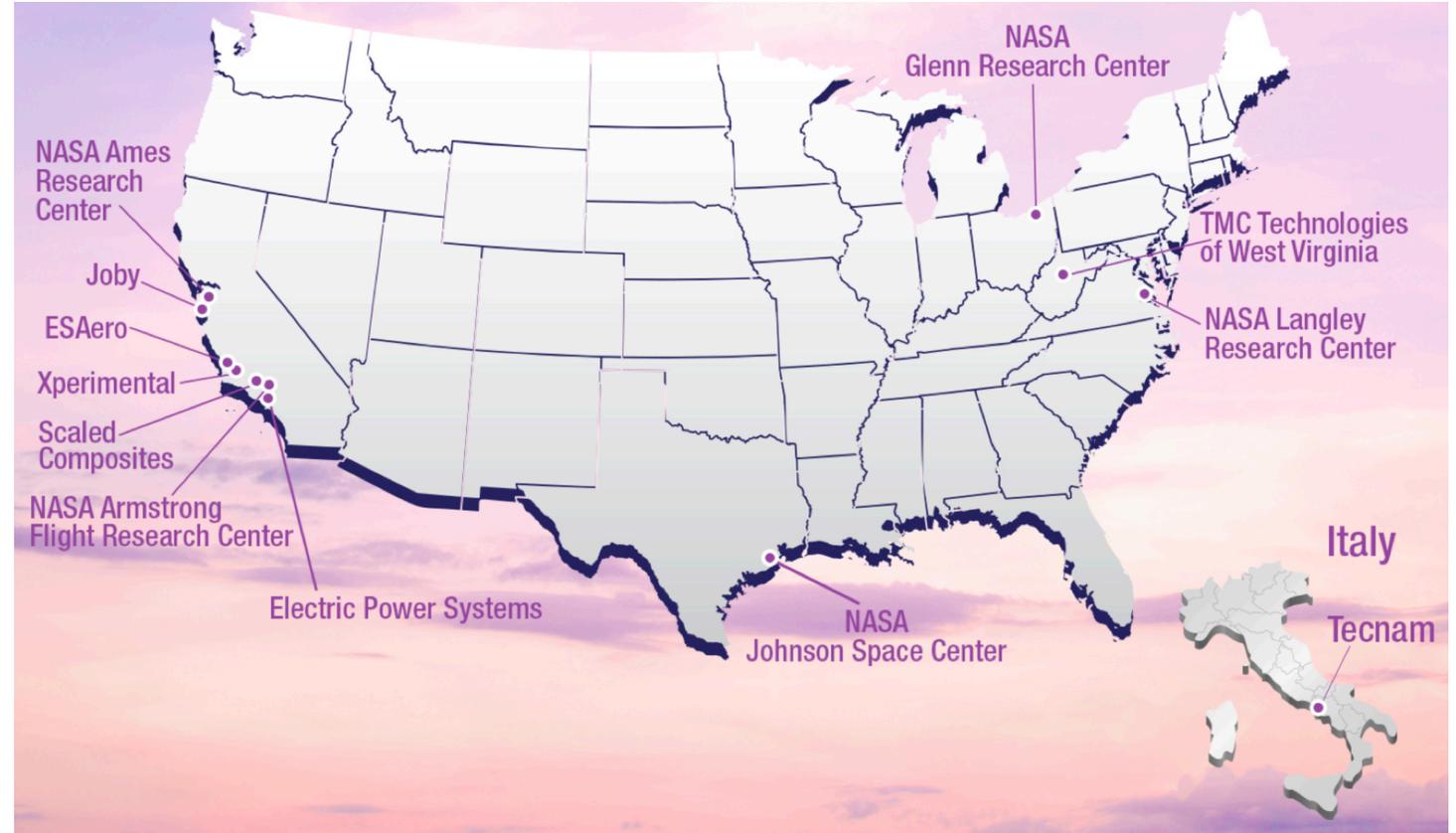


Batteries

Who Works On The X-57?



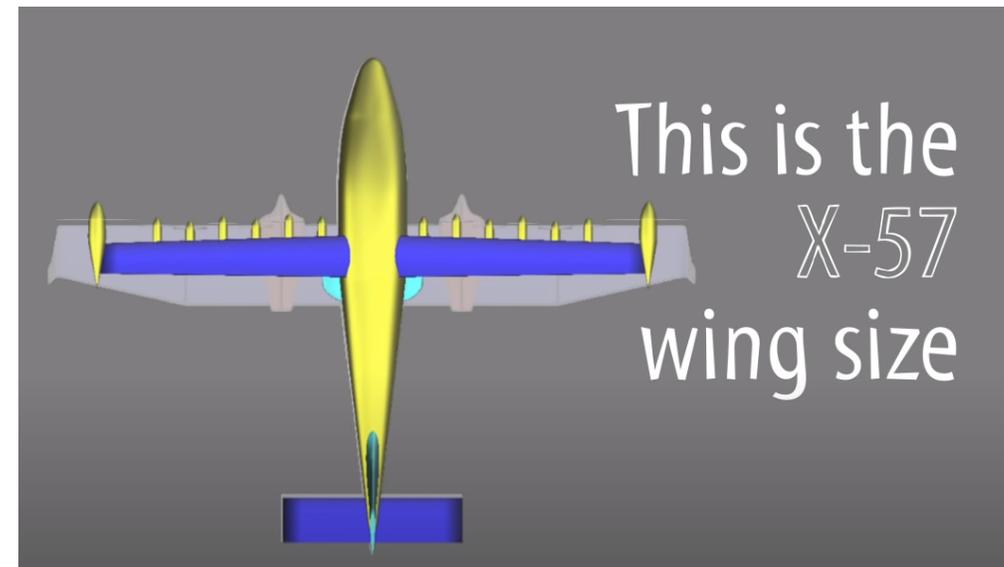
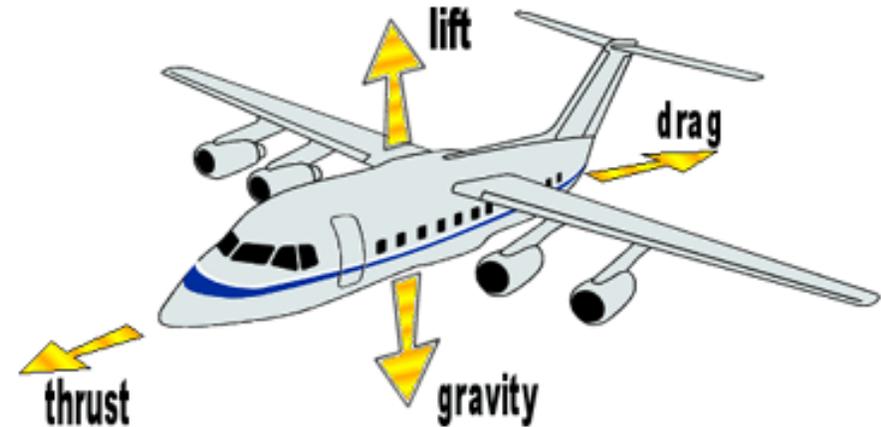
- The X-57 team is very big and spread across the country
- We have many types of scientists and engineers working on the X-57
 - Aerospace Engineers
 - Mechanical Engineers
 - Electrical Engineers
 - Computer Scientists
 - Data Scientists
 - Technicians



Why Change The Shape Of The Wing?



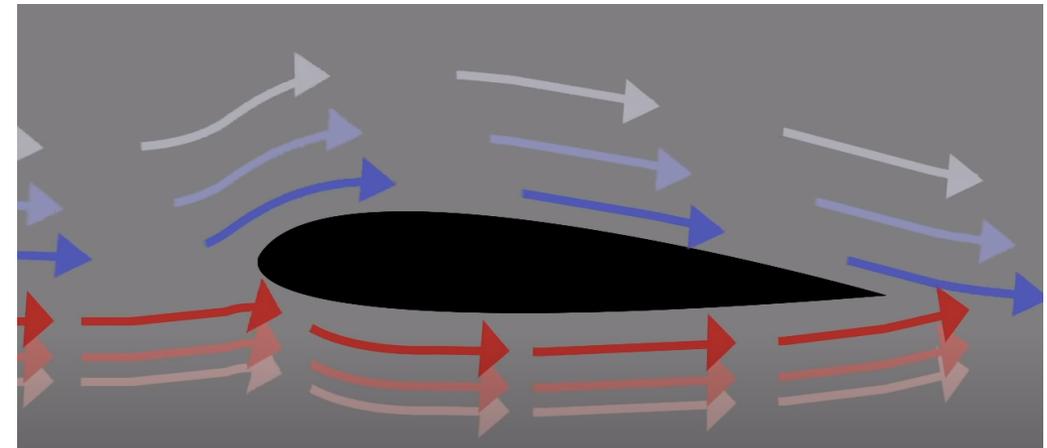
- There are four main forces for flight
 - Can anybody name all four?
- We're using a Tecnam P-2006T airplane and replacing the original wing with a "high-aspect" ratio wing which decreases the amount of energy required in flight.
 - Does anybody know which flight force is reduced?
- Because batteries are so heavy right now, the X-57 is trying to reduce the amount of energy needed in flight in many ways.



Why Are There So Many Propellers?



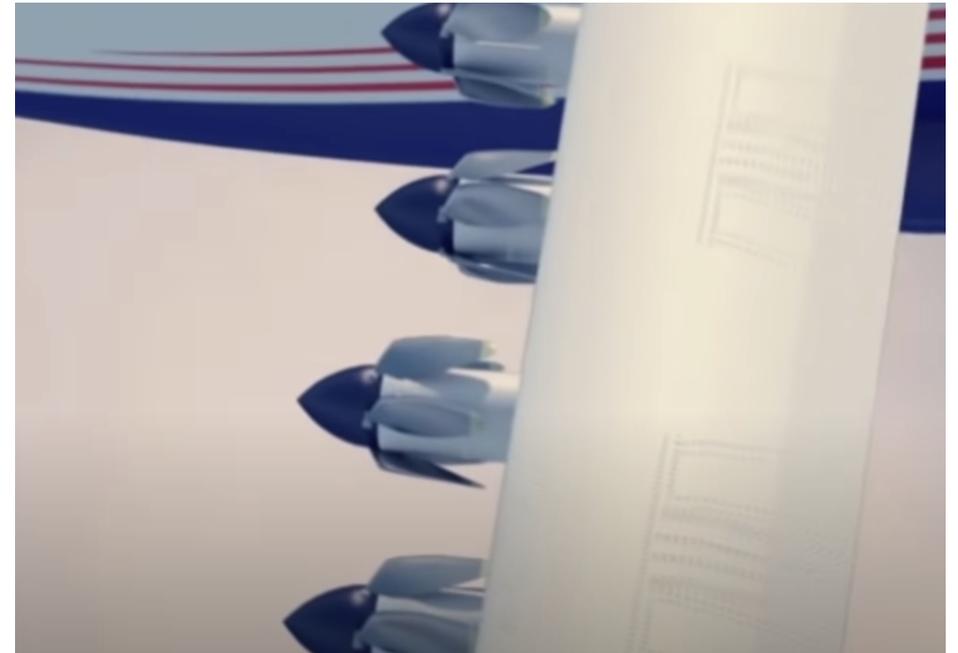
- An airplane needs extra lift force to takeoff. This is because it's going slower at takeoff than when it's flying high in the sky.
- The 12 extra propellers help air move faster over the wing. This give a boost to the lift force.
- The extra lift is only needed during takeoff and landing, and fold back during cruise.
 - Does anybody know why?



Why Do The Propellers Fold Back?



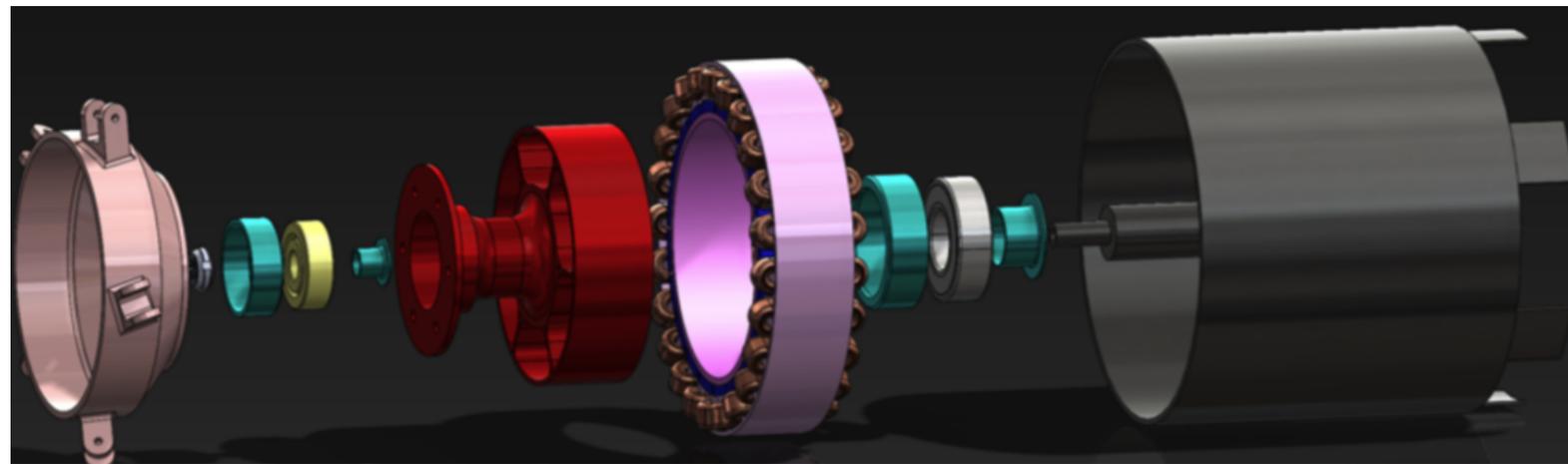
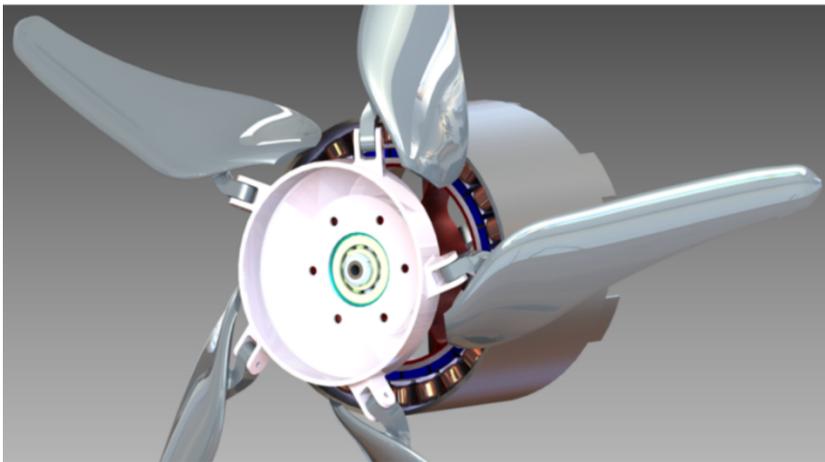
- The X-57 will be moving faster during cruise, and will not need a lifting boost from the 12 extra propellers.
 - Does anybody know what force is decreased by folding back the wings?
- This is another thing the X-57 does to save energy during the flight. Every little new design here counts
 - Reducing energy means reducing the heavy battery needed to fly



How Do The Motors Work?



- All of the motors on the X-57 are electric. This airplane doesn't need any gas to fly!
- The X-57 uses a specific type of motor, called a "Permanent Magnet Synchronous Motor".
- The battery provides all of the current and voltage needed by the electric motors. This is really similar to an electric car.



Summary



- Today we talked about what the X-57 is, and why NASA is working on it.
- We also discussed different types of engineers and what kind of work they do for the X-57.
- Then we explained the different things the X-57 is doing to reduce energy, like changing the wing shape and adding 12 propellers
- Finally we talked about what makes the X-57 fly and what kind of electric motors are used.



Questions?